

Claims

- [c1] 1. A modular plastic conveyor belt comprising:
- a series of rows of belt modules, each row extending laterally in width from a first side edge to a second side edge, longitudinally in the direction of belt travel from a leading end to a trailing end, and in depth from a top side to a bottom side, wherein each row includes:
 - at least one belt module forming the row;
 - a central beam formed in each belt module and arranged laterally across the width of the row, the central beam including a leading wall and an opposite trailing wall defining a beam thickness between the walls;
 - a plurality of laterally spaced leading hinge members extending generally longitudinally from the leading wall and forming laterally aligned holes through the leading hinge members;
 - a plurality of laterally spaced trailing hinge members extending generally longitudinally from the trailing wall and forming laterally aligned holes

through the trailing hinge members;
wherein the thickness of the central beam is
greater at the middle of the row than at the first
and second side edges;
a plurality of hinge pins extending through lateral
passageways formed by the aligned holes through
interleaved leading and trailing hinge members of
consecutive rows to interconnect the rows into an
endless conveyor belt.

[c2] 2. A modular plastic conveyor belt as in claim 1 wherein
the central beam includes:

a first sinuous portion extending inward along the
row from the first side edge of the row;
a second sinuous portion extending inward along the
row from the second side edge of the row; and
a linear portion disposed between the first sinuous
portion and the middle of the row and characterized
by generally straight leading and trailing walls.

[c3] 3. A modular plastic conveyor belt as in claim 2 wherein
the linear portion includes:

a constant thickness portion in a middle region of
the belt;
a first tapered portion disposed between the con-
stant thickness portion and the first sinuous portion

and characterized by a thickness decreasing toward the first side edge.

- [c4] 4. A modular plastic conveyor belt as in claim 2 wherein the leading and trailing hinge members extending from the linear portion of the central beam each include:
- first hinge members having a laterally narrow end distal from the central beam; and
 - second hinge members having a laterally broad end distal from the central beam;
- wherein the second hinge members are arranged successively in pairs separated by a single first hinge member disposed between successive pairs.
- [c5] 5. A modular plastic conveyor belt as in claim 2 wherein the thickness of the central beam in the linear portion decreases monotonically from the middle of the row toward at least one of the first and second side edges of the row.
- [c6] 6. A modular plastic conveyor belt as in claim 1 wherein the central beam extends in depth from the top side to the bottom side of the row.
- [c7] 7. A modular plastic conveyor belt as in claim 1 wherein each row includes:
- a first edge module at the first side edge of the row

characterized by a first edgemost region in which the central beam is sinuous and a second region in which the central beam is linearly tapered in thickness; and a second edge module at the second side edge of the row characterized by a first edgemost region in which the central beam is sinuous and a second region in which the central beam is linearly tapered in thickness.

- [c8] 8. A modular plastic conveyor belt as in claim 1 wherein each row includes:
- at least one module at the middle of the row in which the central beam is of constant thickness;
 - a first edge module at the first side edge of the row in which the central beam decreases in thickness toward the first side edge; and
 - a second edge module at the second side edge of the row in which the central beam decreases in thickness toward the second side edge.
- [c9] 9. A modular plastic conveyor belt comprising:
- a series of rows of belt modules, each row extending laterally in width from a first side edge to a second side edge and longitudinally in the direction of belt travel from a leading end to a trailing end, wherein each row includes:

at least one belt module forming the row;
a central beam formed in each belt module and arranged laterally across the width of the row and having a beam thickness generally in the direction of belt travel;
a plurality of laterally spaced leading hinge members extending generally longitudinally from the central beam toward the leading end and forming laterally aligned holes through the leading hinge members;
a plurality of laterally spaced trailing hinge members extending generally longitudinally from the central beam toward the trailing end and forming laterally aligned holes through the trailing hinge members;
wherein the central beam includes sinuous portions near the first and second side edges of the row and a linear portion in a middle region of the row;
a plurality of hinge pins extending through lateral passageways formed by the aligned holes through interleaved leading and trailing hinge members of consecutive rows to interconnect the rows into an endless conveyor belt.

- [c10] 10. A conveyor belt as in claim 9 wherein the beam thickness is greater in the linear portion than in the sinuous portions.
- [c11] 11. A conveyor belt as in claim 9 wherein the linear portion includes a portion of constant beam thickness.
- [c12] 12. A conveyor belt as in claim 9 wherein the linear portion includes a tapered portion of linearly decreasing beam thickness.
- [c13] 13. A conveyor belt as in claim 9 wherein the beam thickness in the sinuous portions decreases monotonically toward the nearer side edge of the belt.
- [c14] 14. A conveyor belt as in claim 9 wherein the central beam is disposed generally midway between distal ends of the leading hinge members and of the trailing hinge members.
- [c15] 15. A modular plastic conveyor belt suitable for following a curved conveying path, the conveyor belt comprising:
a series of rows of belt modules, each row extending laterally in width from a first side edge to a second side edge and longitudinally in the direction of belt travel from a first end to a second end, wherein each row includes:
at least one belt module forming the row;

a central beam formed in each belt module and arranged laterally across the width of the row and having a beam thickness generally in the direction of belt travel;

a first plurality of laterally spaced hinge members extending generally longitudinally from the central beam toward the first end of the row and forming laterally aligned holes through the first hinge members;

a second plurality of laterally spaced hinge members extending generally longitudinally from the central beam toward the second end of the row and forming laterally aligned and longitudinally elongated holes through the second hinge members; indexing means for preventing adjacent rows from relative lateral motion;

a plurality of hinge pins extending through lateral passageways formed by the aligned holes through interleaved first and second hinge members of consecutive rows to interconnect the rows into an endless conveyor belt.

- [c16] 16. A modular plastic conveyor belt as in claim 15 wherein the central beam includes sinuous portions near

the first and second side edges of the row and a linear portion in a middle region of the row.

[c17] 17. A conveyor belt as in claim 16 wherein the beam thickness is greater in the linear portion than in the sinuous portions.

[c18] 18. A conveyor belt as in claim 16 wherein the linear portion includes a portion of constant beam thickness.

[c19] 19. A conveyor belt as in claim 16 wherein the linear portion includes a tapered portion of linearly decreasing beam thickness.

[c20] 20. A conveyor belt as in claim 16 wherein the beam thickness in the sinuous portions decreases monotonically toward the nearer side edge of the belt.

[c21] 21. A conveyor belt as in claim 15 wherein the indexing means comprises:

narrow-ended hinge members selected from the first and second pluralities of hinge members and having a laterally narrow end distal from the central beam;
and

broad-ended hinge members selected from the first and second pluralities of hinge members and having a laterally broad end distal from the central beam;
wherein at least two broad-ended hinge members

are arranged successively and separated between their broad distal ends by a narrow gap sized slightly greater than the narrow distal ends of the narrow-ended hinge members.

[c22] 22. A conveyor belt as in claim 21 wherein the narrow-ended hinge members and the broad-ended hinge members extend from the linear portion of the central beam.

[c23] 23. A conveyor belt as in claim 21 wherein one of the narrow-ended hinge members along the second end of a row is received in the gap between successive broad-ended hinge members along the first end of an adjacent row.

[c24] 24. A conveyor belt as in claim 15 wherein the indexing means comprises:

selected hinge members of the first and second pluralities that include a leg including opposite side walls extending longitudinally from the central beam to a distal end that includes opposite side surfaces defining a lateral breadth therebetween that is broader than the leg;
wherein the leg of each of the selected hinge members is offset laterally from the centerline of the distal end.

- [c25] 25. A conveyor belt as in claim 24 wherein one of the side walls of the legs is coplanar with one of the side surfaces of the distal end.
- [c26] 26. A conveyor belt as in claim 24 wherein every other of the hinge members of the second plurality of hinge members in a middle region of the belt rows is a selected hinge member.
- [c27] 27. A conveyor belt as in claim 15 wherein each of the first and second pluralities of hinge members includes a leg extending from the central beam to a distal end, wherein the leg of each of the broad-ended hinge members is narrower than its broad distal end.
- [c28] 28. A conveyor belt as in claim 15 wherein each of the first and second pluralities of hinge members includes a leg extending from the central beam to a distal end, wherein the legs of the first and second pluralities of hinge members are narrower than the distal ends.
- [c29] 29. A conveyor belt as in claim 15 wherein the central beam is disposed generally midway between distal ends of the first plurality of hinge members and of the second plurality of hinge members.